

U.S. NUCLEAR REGULATORY COMMISSION OBSERVATION AUDIT REPORT  
NO. OAR-05-02, "OBSERVATION AUDIT OF BECHTEL SAIC COMPANY, LLC QUALITY  
ASSURANCE SUPPLIER AUDIT BQA-AS-05-04 OF JOSEPH OAT CORPORATION"

**/Tom Matula RA for Vincent Everett/**

Date 6/1/05

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Enclosure

## 1.0 INTRODUCTION

On April 26–28, 2005, staff from the U.S. Nuclear Regulatory Commission (NRC) Division of High-Level Waste Repository Safety, Region IV, and the Center for Nuclear Waste Regulatory Analyses (CNWRA) observed the Bechtel SAIC Company, LLC (BSC), audit BSC–AS–05–04 of the Joseph Oat Corporation in Camden, New Jersey. The purpose of this audit was to evaluate the effectiveness of the Joseph Oat Corporation Quality Assurance (QA) program as delineated in BSC Purchase Order QA–POA–00002, January 27, 2005, for the 21-PWR Uncanistered Fuel Prototype Assembly. The scope of the audit was an evaluation of the Joseph Oat Corporation Quality System Manual, Revision 18, dated May 21, 2003, and associated implementing procedures for the Fabrication and Assembly of the 21-Pressurized Water Reactor (PWR) Uncanistered Fuel Prototype Waste Package. The NRC observers (observers) assessed the effectiveness of the audit team and the audit process in achieving the audit objective.

## 2.0 MANAGEMENT SUMMARY

BSC conducted a compliance-based audit of the Joseph Oat Corporation QA program as described in the Joseph Oat Corporation Quality System Manual. The Joseph Oat Corporation QA program was based on ASME International requirements with added provisions to meet the U.S. Department of Energy (DOE), Office of Civilian Radioactive Waste Management (OCRWM), Quality Assurance Requirements and Description (QARD), DOE/RW-033P, Revision 17, and BSC purchase order requirements. A review of the 18 programmatic QA criteria described in the Joseph Oat Corporation Quality System Manual was conducted as prompted by the BSC audit checklists. Specific checklist questions were also used to review special processes of welding and nondestructive examination (NDE) activities. The NDE disciplines applied at Joseph Oat Corporation included Radiography, Liquid Penetrant, Ultrasonic, and Visual Testing.

The BSC auditors (auditors) determined that Joseph Oat Corporation was effectively implementing its QA program and the requirements of the BSC purchase order. The auditors also determined that Joseph Oat Corporation will remain an approved supplier to BSC without restriction.

The observers determined that the BSC performed the audit effectively and the auditors demonstrated sound knowledge of the applicable implementing procedures and QA program requirements. The auditors conducted thorough interviews, challenged and questioned responses when appropriate, and effectively employed their checklists. The observers agreed with the audit team conclusions and findings.

## 3.0 AUDIT PARTICIPANTS

### Auditors

David Hathcock, Audit Team Leader  
Howard Cox, Auditor  
Daniel Klimas, Auditor  
Steven Gauthier, Auditor  
James George, Technical Specialist

## Observers

Vincent Everett, Observation Team Leader, NRC  
Aladar Csontos, Technical Specialist, NRC  
Rodney Weber, QA Specialist, CNWRA

## 4.0 REVIEW OF THE AUDIT AND AUDITED ORGANIZATION

The auditors conducted the audit in accordance with the DOE/OCRWM Administrative Procedure (AP)–18.2Q–OCRWM, “Supplier Surveys/Audits.” The auditors reported conditions adverse to quality in accordance with BSC Line Procedure (LP)–16.5Q–BSC, “Managing Supplier Condition Reports.” The observers followed NRC Manual Chapter 2410, “Conduct of Observation Audits,” July 12, 2000, while observing the audit.

### 4.1 Scope of the Audit

The auditors conducted a compliance-based audit of the Joseph Oat Corporation quality system and its implementation as defined in the following documents:

- Joseph Oat Corporation Quality System Manual, Revision 18, May 21, 2003
- BSC Purchase Order QA–POA–00002, January 27, 2005
- BSC Design Specification 000–3SS–DSU0–00300–000–002, January 13, 2005

The auditors evaluated the effectiveness of QA program implementation using checklist inquiries based on the DOE QARD.

### 4.2 Conduct and Timing of the Audit

The observers determined that the audit was performed effectively and the audit team demonstrated sound knowledge of the applicable implementing procedures and QA program requirements. The audit team members conducted thorough interviews, challenged and questioned responses when appropriate, and effectively employed their checklists. The auditors, Joseph Oat Corporation management, and observers met at the end of each day to discuss the audit status and any new and developing issues. The auditors met each morning with the observers to discuss the current audit status, potential issues, and schedule for activities of the day.

The Joseph Oat Corporation QA program was based on ASME International requirements with added provisions to meet the QARD and BSC purchase order requirements. The timing of the audit was appropriate because Joseph Oat Corporation had implemented the material rolling process and welding had begun during the audit on the prototype package. Monitoring the welding process during the audit was valuable for both the auditors and observers in determining the effectiveness of the Joseph Oat Corporation quality program.

### 4.3 Audit Team Qualifications and Independence

The observers reviewed the qualifications for the Audit Team Leader and auditors and determined that they were qualified and independent of the areas reviewed. The auditors had considerable experience in QA, ranging from 16 to 37 years. Three auditors had over 10 years

experience with 10 CFR Part 50, Appendix B-type QA programs.

#### 4.4 Examination of Quality Assurance Elements

##### 4.4.1 Organization

The auditors determined that the organizational structure and reporting responsibilities were defined and documented. Responsibilities for the QA and quality control (QC) functions within the Joseph Oat Corporation organization were organizationally separate and independent from the fabrication activities. The QA functions reported directly to the President of Operations.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

##### 4.4.2 Quality Assurance Program

The auditors reviewed the certification and training records for QA and QC personnel. Records, including NDE certifications and related records, were reviewed for these personnel and found to be acceptable. All certification records were found to be current.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

##### 4.4.3 Design Control

Design controls related to interface with BSC were reviewed. The flow down of requirements and implementation of those requirements were the subjects of this audit. Deficiencies, when identified by Joseph Oat Corporation, were reported to BSC using Supplier Deviation Disposition Requests. During this audit, the auditors determined that 19 Supplier Deviation Disposition Requests have been issued on this project. These requests had been submitted to and approved by the BSC organization.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

##### 4.4.4 Procurement Document Control

The auditors reviewed records for weld material procurement, calibration suppliers, and plate material suppliers.

The auditors noted that Joseph Oat Corporation Purchase Order 56995, issued to Jersey Welding (Sandvik Mill), specified that the material was to be supplied in accordance with ASME subsection NC2420, "Required Tests." This subsection requires that when the producing mill allows splicing, a chemical analysis shall be performed on each end of the coil. While not specifically called out in Purchase Order 56995, the Sandvik Certified Mill Test Report did not state that no splicing was performed. The Joseph Oat Corporation QA manager contacted the Sandvik Mill during the audit, and Sandvik agreed to revise the Certified Mill Test Report. A revised Certified Mill Test Report, incorporating the statement concerning no splicing, was faxed to Joseph Oat Corporation and reviewed by the auditors. With this exception, the auditors found procurement document control to be acceptable.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.5 Procedures, Instructions, and Drawings

Joseph Oat Corporation Standard Procedures (SPs) implemented the requirements of the Joseph Oat Corporation Quality System Manual. In addition, procedures required to address specific contract requirements had been prepared for this project. Procedures in existence during the audit pertinent to the BSC purchase order included:

- Nondestructive evaluation: liquid penetrant, radiographic, pneumatic, mass spectrometer leak, visual, and ultrasonic testing; and
- Welding and related procedures: fit up, dimensional, weight, marking, and cleaning.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.6 Document Control

A document submittal listing, which provides status tracking for all project-related documents, is maintained internally by Joseph Oat Corporation. Documents associated with the BSC purchase order were submitted to BSC for approval. Records of approvals were maintained in the quality manager files.

During the review of the BSC approval documentation, one approval transmittal, BSC document ENG 20040830.0013 dated August 29, 2004, for procedure SP-2637-34, "Mass Spectrometer Leak Testing," did not correctly identify that the transmittal pertained to Revision 1 (i.e., no revision level was indicated). The auditors identified this finding as a potential condition adverse to quality within BSC.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.7 Purchasing

The auditors reviewed purchase documents related to materials and services suppliers. The Purchase Order 56995 for 316L weld wire had been revised verbally to accommodate the purchase of a more readily available weld wire diameter. The Purchase Order, however, was not formally revised and the receiving inspection did not identify the discrepancy between the size of the weld wire received and that specified in the approved purchase document. The auditors identified this as a potential condition adverse to quality, as described in Section 4.4.10 below.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.8 Identification and Control of Items

The auditors found that materials stored in the stock room were annotated with the project

number or purchase order numbers. Materials for this project had been annotated with the project number when received and inspected. The stock room was manned and material check out was controlled with a system requiring sign-out and return logging.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.9 Control of Special Processes

The auditors reviewed the following approved drawings, procedures, and QA records:

- BSC 21-PWR Uncanistered Fuel Prototype Assembly Drawing DWG# D-12241.01
- Weld Procedure Specifications with Weld Wire Specifications
  - 8628A (Alloy 22 to Alloy 22)
  - 4303, 5301, and 8303 [316 Stainless Steel (SS) to 316SS]
  - 4305, 7304, and 8301 (316SS to Carbon Steel)
  - 4101, 7102, and 8101 (Carbon Steel to Carbon Steel)
- Weld Procedure Qualification Records
  - 56231 (Alloy 22 to Alloy 22)
  - 16/1, 16/4, 17663, 23776 (316SS to 316SS)
  - 1010 and 1023 (316SS to Carbon Steel)
  - 010104042 and 22B/1 (Carbon Steel to Carbon Steel)
- QC and Nondestructive Evaluation Procedures
  - Liquid Penetrant Examination Exam QC-2637-10
  - Radiographic Examination QC-2637-20
  - Pneumatic Testing QC-2637-30
  - Mass Spectrometer Leak Testing QC-2637-34
  - Visual Examination of Welds QC-2637-60
  - Ultrasonic Examination QC-2637-80
- Other Ancillary Procedures and Instructions
  - Cleaning, Handling, and Temporary Marking Procedure JP-2637-40
  - Part Marking JP-2637-41
  - Part Weighing JP-2637-42
  - Measurements of Major Dimensions JP-2637-43
  - Basket Gauge Test JP-2637-44
  - Trial Fit of Lids JP-2637-45
  - Packaging and Shipping JP-2637-46
- Welder Maintenance Log
- Nondestructive Evaluator Qualification List with expiration dates and eye exams
- Welder Qualification Material Requisition Slips
- Traveler Documents

BSC requires that Joseph Oat Corporation submit its procedures to BSC for approval before implementation. The auditors found that all implemented procedures had been submitted to, and were approved by, BSC Design and Engineering prior to being incorporated as Joseph Oat Corporation standard procedures for this job. The auditors noted that Procedure JP-2637-50, Anneal and Quench of the Outer Barrier, had not yet been submitted to BSC for approval and that this procedure had not yet been implemented into the Joseph Oat Corporation QA procedures.

The auditors and Joseph Oat Corporation QA personnel witnessed the implementation of the approved Cleaning, Handling, and Temporary Marking Procedure JP-2637-40 and 316SS to 316SS Welding Procedure Specification 5301 for submerged arc welding of the inner stainless steel canister.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.10 Inspection

As discussed in Section 4.4.7 above, the receiving inspection associated with Purchase Order 56995 was not in compliance with Joseph Oat Corporation Quality System Manual, Section 3.2.3. The weld wire received did not match the weld wire size specified in the approved purchase order. Also, the dimensional and weight attributes were not inspected. The Joseph Oat Corporation Inspection Report listed the wire diameter as 1/16 inch; however, this observation was not the result of a dimensional inspection. The auditors identified this finding as a potential condition adverse to quality.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.11 Test Control

The auditors reviewed test procedures and test results documented on Joseph Oat Shop Operation Travelers. No deficiencies were identified.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.12 Control of Measuring and Test Equipment

The auditors observed and verified weld rod furnace monitoring instruments, gages, and dimensional measuring equipment for National Institute for Science and Technology traceability, calibration labels, due dates, and supplier acceptability. Joseph Oat Corporation maintained a master index of equipment to assist with equipment control. No issues were identified regarding calibration.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.



#### 4.4.13 Handling, Storage, and Shipping

The auditors observed the implementation of Weld Cleaning Procedure 2637-40, regarding marking of materials, cleaning materials, and certifications for these materials and found no issues regarding this procedure.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.14 Inspection, Test, and Operating Status

The auditors reviewed operating controls which are maintained through the use of Joseph Oat Shop Operation Travelers that provide status and acceptance of the work conducted. No issues were identified regarding operating controls.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.15 Control of Nonconformances

Four internal deviation notices associated with the BSC purchase order had been written, including the corrected purchase order found during this audit. The auditors determined that these purchase order deviations were not significant enough to report to BSC through the Supplier, Deviation, Disposition Request process.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.16 Corrective Action

The auditors determined that follow up activities conducted by Joseph Oat Corporation on previous audit findings for nine conditions adverse to quality were satisfactorily implemented.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.17 QA Records

During the review of welding operations, the auditors determined that material requisition slips were not maintained in the location specified by the Joseph Oat Corporation QA program. The auditors found that, prior to submittal to BSC, records were actually stored in the Quality Manager's office in a 1-hour fire-rated cabinet. This deficiency was corrected during the audit.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.4.18 Audits

The auditors reviewed five internal and five external audits performed by the Joseph Oat Corporation in 2004. All elements of the QA program were covered. The procedure for



qualifying auditors required that an oral examination be administered and documented on the qualification record. However, the auditors found that the required oral examination had not been documented on one qualification record reviewed, which was corrected during the audit. In addition, the procedure for auditor qualification was modified to require that a written examination is required. The auditors also found that the annual assessment for one lead auditor had typographical errors which were corrected. No other issues were identified.

The observers determined that the audit was effective in this area and agreed with the conclusion of the auditors.

#### 4.5 Potential Audit Findings

The auditors identified two potential conditions adverse to quality:

- A BSC procedure acceptance document did not identify the revision number of the subject procedure. The audit team attributed this condition to BSC. (Refer to Section 4.4.6 above.)
- A receipt inspection of the weld wire did not identify the discrepancies between the approved purchase document and the material received. (Refer to Sections 4.4.7 and 4.4.10 above.)

The auditors identified two conditions adverse to quality that were corrected during the audit:

- Information was added to a material test report. (Refer to Section 4.4.4 above.)
- The location of weld material records was corrected. (Refer to Section 4.4.17 above.)

### 5.0 NRC STAFF FINDINGS

#### 5.1 NRC Observation Summary

The observers determined that the audit was performed effectively and the auditors demonstrated sound knowledge of the applicable implementing procedures and QARD requirements. The auditors conducted thorough interviews, challenged and questioned responses when appropriate, and effectively employed their checklists. The observers agreed with the auditors conclusions that the Joseph Oat Corporation QA program was being effectively implemented. The observers agreed with the auditors findings and process improvement recommendations.

#### 5.2 NRC AUDIT OBSERVER INQUIRY

No Audit Observer Inquiries were initiated during this audit.